

Characterising Resistance Profile of Staphylococci Isolated from Bovine Milk

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Structured Abstract

Background: Staphylococci is a major pathogen associated with bovine mastitis, particularly in subclinical cases, leading to decreased milk production and significant economic losses in dairy farming. *S. aureus* responds poorly to antibiotic treatment, due to the emergence of antibiotic resistance (AR), biofilm formation, and intracellular invasion into bovine mammary cells. Recently, coagulase-negative staphylococci (CoNS) have been reported as a significant pathogen associated with bovine mastitis due to high resistance against antibiotics. The present study aims to determine the antibiotic resistance profiles of staphylococci associated with bovine mastitis from a dairy farm in Melaka, Malaysia.

Methods: A total of 30 presumptive staphylococci isolates originated from bovine milk from a local farm were subjected to antibiotic susceptibility testing (AST) against linezolid, ciprofloxacin and chloramphenicol using disk diffusion assay. Selected isolates were subjected to molecular identification through *sodA* gene amplification and sequencing. Biofilm formation activity was also determined on these resistant isolates.

Results: This study shows that 29 of 30 isolates were catalase-positive, coagulase-negative, and oxidase-negative, consistent with common characteristics of coagulase-negative staphylococci (CoNS). An isolate (UMMY18) exhibited a coagulase-positive reaction, matching the typical *S. aureus* profile. AST showed 100% susceptibility to linezolid, with 97% susceptibility to ciprofloxacin and chloramphenicol. Notably, one isolate (UMMP142) demonstrated resistance to chloramphenicol and intermediate resistance to ciprofloxacin. Sequence analysis identified UMMY18 as *S. aureus* and UMMP142 as *S. chromogenes*. Biofilm formation assays classified all isolates as non-biofilm producers, except one (UMMY153), which result was inconclusive. Interestingly, UMMP142 exhibited resistance mechanisms that are not dependent on the biofilm formation, suggesting the presence of other resistance genes.

Conclusion: In conclusion, this study found that CoNS are the predominant pathogens in bovine mastitis, with one isolate identified as *S. aureus*. The antibiotic susceptibility profiles suggest high effectiveness of linezolid, ciprofloxacin, and chloramphenicol, though resistance was observed in one isolate. Molecular identification confirmed the species, and biofilm formation was not observed in all isolates. These findings underscore the need for regular monitoring of resistance profiles and the mechanisms underlying antibiotic resistance in bovine mastitis-associated staphylococci.

Keywords: *S. aureus*, coagulase-negative staphylococci, bovine mastitis, subclinical mastitis

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